

CLAIMS

1.(previously amended) An isolated nucleic acid molecule comprising the nucleotide sequence described in SEQ ID NO: 3.

2.(previously amended) An isolated nucleic acid molecule comprising a nucleotide sequence that:

- (a) encodes the amino acid sequence shown in SEQ ID NO: 4; and
- (b) hybridizes under highly stringent conditions to the nucleotide sequence of SEQ ID NO:3 or the complement thereof.

3.(original) An isolated nucleic acid molecule according to Claim 2 wherein said nucleotide sequence is present in cDNA.

4. - 5. (cancelled)

6.(original)An isolated nucleic acid molecule comprising a sequence encoding the amino acid sequence presented in SEQ ID NO:4.

7.(cancelled)

8. (previously presented) An expression vector comprising a nucleotide sequence that encodes the amino acid sequence shown in SEQ ID NO:4.

9. (previously presented) A cell comprising the expression vector of Claim 8.

RESPONSE

I. Status of the Claims

Claims 4, 5 and 7 were previously cancelled entirely without prejudice and without disclaimer. Claims 1-3, 6, 8 and 9 are presently pending in the case.

II. Support for Amendments

The abstract of the present application has been amended as the Examiner has repeatedly insisted. Support for the new abstract can be found throughout the specification, sequence listing and claims as originally filed, with particular support being found at least at or about page 20, line 1. Therefore as the amendments to the abstract are fully supported by the specification, sequence listing and claims as originally filed, they do not constitute new matter and entry is thus respectfully requested.

III. Objection

The Final Action maintains the objection to the abstract of the application as being non-descriptive. The Examiner has chosen to discount the fact that many issued U.S. Patents have abstracts that are **identical** to the present abstract. While in no way agreeing with the Examiners position and, simply to progress this application to issuance Appellants have amended the Abstract to read as follows. "Novel human polynucleotide and polypeptide sequences are disclosed that encode zinc metalloproteases of the ADAMTS family that can be used in therapeutic, diagnostic, and pharmacogenomic applications."

Having done exactly as the Examiner has repeatedly insisted was required, Applicants request that as the objection has been addressed and that it be withdrawn.

IV. Rejection of All Claims Under 35 U.S.C. § 101

The Final Action maintains the rejection of the claims under 35 U.S.C. § 101, allegedly because the claimed invention lacks support by either a specific and substantial asserted utility or a well established utility. Applicants disagree and respectfully maintain their traverse as presented in their previous response (Paper No. 7 which is herein incorporated in its entirety).

The Final Action discounts many of the numerous utilities described in the specification for the sequences of the present invention based on the position that while credible, these utilities are not specific or substantial. While Applicants in no way agree with the Examiner's arguments, Applicants have chosen to expand on only a few of the utilities as only one is required.

Applicants respectfully submit that the legal test for utility involves an assessment of whether those skilled in the art would find any of the utilities described for the invention to be credible or believable. According to the Examination Guidelines for the Utility Requirement, if the applicant has asserted that the claimed invention is useful for any particular purpose (i.e., it has a "specific and substantial utility") and the assertion would be considered credible by a person of ordinary skill in the art, the Examiner should not impose a rejection based on lack of utility (66 Federal Register 1098, January 5, 2001).

In *In re Brana*, (34 USPQ2d 1436 (Fed. Cir. 1995), "*Brana*"), the Federal Circuit admonished the P.T.O. for confusing "the requirements under the law for obtaining a patent with the requirements for obtaining government approval to market a particular drug for human consumption". *Brana* at 1442. The Federal Circuit went on to state:

At issue in this case is an important question of the legal constraints on patent office examination practice and policy. The question is, with regard to pharmaceutical inventions, what must the applicant provide regarding the practical utility or usefulness of the invention for which patent protection is sought. This is not a new issue; it is one which we would have thought had been settled by case law years ago.

Brana at 1439, emphasis added. The choice of the phrase "utility or usefulness" in the foregoing quotation is highly pertinent. The Federal Circuit is evidently using "utility" to refer to rejections under 35 U.S.C. § 101, and is using "usefulness" to refer to rejections under 35 U.S.C. § 112, first paragraph. This is made evident in the continuing text in *Brana*, which explains the correlation between 35 U.S.C. §§ 101 and 112, first paragraph. The Federal Circuit concluded:

FDA approval, however, is not a prerequisite for finding a compound useful within the meaning of the patent laws. Usefulness in patent law, and in particular in the context of pharmaceutical inventions, necessarily includes the expectation of further research and development. The stage at which an invention in this field becomes useful is well before it is ready to be administered to humans. Were we to require Phase II testing in order to prove utility, the associated costs would prevent many companies from obtaining patent protection on promising new inventions, thereby

eliminating an incentive to pursue, through research and development, potential cures in many crucial areas such as the treatment of cancer.

Brana at 1442-1443, citations omitted. In assessing the question of whether undue experimentation would be required in order to practice the claimed invention, the key term is “undue”, not “experimentation”. *In re Angstadt and Griffin*, 190 USPQ 214 (C.C.P.A. 1976). The need for some experimentation does not render the claimed invention unpatentable. Indeed, a considerable amount of experimentation may be permissible if such experimentation is routinely practiced in the art. *In re Angstadt and Griffin, supra; Amgen, Inc. v. Chugai Pharmaceutical Co., Ltd.*, 18 USPQ2d 1016 (Fed. Cir. 1991). As a matter of law, it is well settled that a patent need not disclose what is well known in the art. *In re Wands*, 8 USPQ 2d 1400 (Fed. Cir. 1988).

Even under the newly installed utility guidelines, Applicants note that MPEP 2107 (II)(B)(1) states:

(1) If the applicant has asserted that the claimed invention is useful for any particular practical purpose (i.e., it has a “specific and substantial utility”) and the assertion would be considered credible by a person of ordinary skill in the art, do not impose a rejection based on lack of utility. (MPEP 2107 (II)(B)(1))

Applicants would first like to invite the Examiner’s attention once again to the fact that a sequence that is 100% identical at the amino acid level to SEQ ID NO:4 of the present invention over its entire 950 amino acid sequence is present in GenBank, the world’s largest repository of such information. This protein, GenBank accession number NP_620686.1, has been annotated by third party scientists, wholly unaffiliated with Applicants, as encoding a disintegrin-like and metalloprotease (repolysin type) with thrombospondin type 1 motif, 15 preproprotein [*Homo sapiens*] (description and amino acid alignment and GeneBank report provided in Applicants previous response as Exhibit A).

The claimed sequences were described in the specification as being similar to metalloproteinases, especially zinc metalloproteases of the ADAMTS family (page 20, lines 1-2 and page 2, line 4). These statements assert that the sequences of the present invention and zinc metalloproteases of the ADAMTS family share a similarity in structure, a similarity in function and thus a recognized similarity in biological function. This position would be readily accepted by those

of skill in the art, as it is generally recognized that there is a structure-function relationship. Absent any evidence of record that the described human metalloproteases somehow fails to function as does zinc metalloproteases of the ADAMTS family, the Examiner has failed to meet his/her burden of establishing that the Applicants' assertion of protein function is not credible. Accordingly, the Examiner is respectfully requested to either provide evidence that substantially and specifically refutes the Applicants' asserted function/utility, or withdraw the rejection. Clearly, the sequences of the present invention have patentable utility and pending rejections under 35 U.S.C. § 101 and 35 U.S.C. § 112, first paragraph should be withdrawn. his provides clear and convincing evidence that those of skill in the art would recognize Applicants' assertions that the claimed sequences encode a metalloprotease, more specifically ADAMTS15, as credible.

ADAMTS15 is described in the scientific publication entitled "Cloning, expression analysis, and structural characterization of seven novel human ADAMTSs, a family of metalloproteinases with disintegrin and thrombospondin-1 domains." (Cal *et al.*, Gene **283**, 49-62, 2002, abstract previously provided as Exhibit B).

In addition to the previously submitted evidence of utility, ADAMTS15 is known to those of skill in the art to be involved in human cancers. In the last line of the abstract of the publication entitled "Dysregulated expression of adamalysin-thrombospondin genes in human breast carcinoma" by Porter, *et al.* 2004(Clin Cancer Res **10**(7):2429-40, abstract provided as **Exhibit 1**) it is stated that "ADAMTS15 has emerged as being an independent predictor of survival, with RNA expression levels significantly lower ($P=0.0007$) in grade 3 breast carcinoma compared with grade 1 and 2 breast carcinoma." Thus, clearly Applicants assertions regarding the use of the utility of the claimed sequences in diagnostic and prognostic assays as described in the specification is a valuable and credible utility. Therefore, clearly, there can be no question that the claimed sequences of the present invention have a specific, substantial and well established utility.

The legal test for utility simply involves an assessment of whether those skilled in the art would find any of the utilities described for the invention to be credible or believable. Given this GenBank annotation and the described publications, there can be no question that those skilled in the art would clearly believe that the molecule encoded by the sequences of the present invention have specific, substantial and well established utility. As such, the scientific evidence clearly establishes that Applicants have described an invention whose utility is in full compliance with the

provisions of 35 U.S.C. § 101, and therefore Applicants respectfully request withdrawal of the rejection.

If, somehow, the above arguments were not deemed sufficient, it should also be noted that the rejection of the present invention due to lack of patentable utility also runs contrary to Example 10 of the PTO's Revised Interim Utility Guidelines Training Materials (pages 53-55), which establishes that a rejection under 35 U.S.C. § 101 as allegedly lacking a patentable utility and under 35 U.S.C. § 112, first paragraph as allegedly unusable by the skilled artisan due to the alleged lack of patentable utility, is not proper when there is no reason to doubt the asserted utility of a full length sequence that has a similarity score of 95% to a protein having a known function. In the Analysis portion of Example 10 it states that "Based on applicant's disclosure and the results of the PTO search, there is no reason to doubt the assertion that SEQ ID NO:2 encodes a DNA ligase. Further DNA ligases have a well-established use in the molecular biology art based on this class of proteins ability to ligate DNA.Note that if there is a well-established utility already associated with the claimed invention, the utility need not be asserted in the specification as filed..... Thus the conclusion reached from this analysis is that a 35 U.S.C. § 101 and a 35 U.S.C. § 112 first paragraph, utility rejection should not be made."

In the present case, clearly evidence supports Applicants' assertions that the sequences of the present invention encode a human zinc metalloproteases of the ADAMTS family, a class of proteins for which there is a well established utility that is recognized by those of skill in the art. The present case is thus identical to that presented in Example 10 of the Revised Interim Utility Guidelines Training Materials (pages 53-55). In the present case it is clear that the sequences of the present invention encode novel human zinc metalloproteases of the ADAMTS family with greater than a 95% identity (100% identity in the present case) to a protein having a known function (ADAMTS15). However, even if, *arguendo*, Applicants had failed to assert this utility, according to the guidelines "Note that if there is a well-established utility already associated with the claimed invention, the utility need not be asserted in the specification as filed... Thus the conclusion reached from this analysis is that a 35 U.S.C. § 101 and a 35 U.S.C. § 112 first paragraph, utility rejection should not be made"(emphasis added). Thus, the present rejection of the presently claimed invention under a 35 U.S.C. § 101 and a 35 U.S.C. § 112 first paragraph utility rejection should not have been made and should be withdrawn.

The above presented evidence counters the Final Action's suggestion that Applicants knew of no specific, substantial or well-established utility at the time the application was filed. However, the specification details a number of uses for the presently claimed polynucleotide sequences, among these were, use in diagnostic assays such as forensic analysis (see, for example, the specification at page 3, line 10 and page 12, line 7), identification of protein coding sequence and identification of exon splice junctions (see, for example, specification at least at page 11, lines 24-29), in mapping the sequences to a specific region of a human chromosome (see, for example, the specification at page 3, line 4, and in assessing gene expression patterns, particularly using a high throughput "chip" format (see, for example, the specification at page 6, line 10 through page 8).

Naturally occurring genetic polymorphisms such as those described in the present specification, and discussed in the previous Response, are both the basis of, and critical to, *inter alia*, forensic genetic analysis and genetic analysis intended to resolve issues of identity and paternity. These utilities are clearly real world, given that the results of identity and paternal analysis often have great emotional and substantial economic impact. This is not a throw away utility, rather it sounds like a very substantial and real world utility. What could be more substantial and real world than the loss of an individual's freedom through incarceration and in some cases even the loss of life through execution? Yet forensic analysis based on identified polymorphisms is often used to convict or acquit in many cases. Both paternal and forensic genetic analysis is based on the use of identified polymorphisms. This is a well known and generally accepted by those of skill in the art, who would readily recognize the utility and value of any identified polymorphism. Without identified polymorphisms, one would not be able to carry out such forensic or paternal analyses. The present application has identified just such essential polymorphisms within the sequences of the present invention which encode the human zinc metaloproteinase ADAMTS15.

As such polymorphisms are the basis for forensic analysis, paternity identification and population biology studies, which are undoubtedly "real world" utilities, the present sequences must in themselves be useful. In and of themselves each of these polymorphisms, including the silent ones, has significant and specific utility, the specificity of this utility is only amplified by the presence of so many polymorphisms that can arise in various combinations. It is also important to note that the presence of more useful polymorphic markers for such analysis would not mean that the present sequences lack utility.

Applicants respectfully point out that those of skill in the art would readily recognize that the presently described polymorphisms, exactly as they were described in the specification as originally filed, are useful in forensic analysis, population biology and paternity analysis to specifically identify individual members of the human population based on the presence or absence of the described polymorphism. Simply because the use of these polymorphic markers will necessarily provide additional information on the percentage of particular subpopulations that contain one or more of these polymorphic markers does not mean that “additional research” is needed in order for these markers as they are presently described in the instant specification to be of use to forensic science. Without further experimentation those of skill in the art would recognize the utility of the identified polymorphisms and how the asserted markers can distinguish 50% of the population in the worst case scenario. Thus the presence or the absence of a particular specific polymorphism is sufficient for use in the proposed utilities. Applicants provide the following detailed explanation. Those of skill in the art would recognize that in the worst case, least useful situation, a marker would be present in half of a population and absent from the other half. Therefore the probability of an individual having such a marker would be 1 in 2 or 50%. Using the forensic analysis scenario for example, the analysis will have removed 50% of the possible suspects from the list, as either the suspect has the identified polymorphism or not. However, if a polymorphism were present in only say 10% of the population, the probability of an individual having such a polymorphic marker would be 1 in 10 (10%) and 90% of suspects could be eliminated from investigation or prosecution based on the presence or absence of the polymorphism. Clearly eliminating 90% of the suspects is better than eliminating 50% of the suspects. That said, eliminating 50% or half of the suspects on a list is without question very useful to any investigator. To reiterate, using the polymorphic markers as described in the specification as originally filed will definitely distinguish members of a population from one another. In the worst case scenario, each of these markers are useful to distinguish 50% of the population (in other words, the marker being present in half of the population). The ability to eliminate 50% of the population from a forensic analysis clearly is a real world, practical utility. Therefore, any allegation that the use of the presently described polymorphic markers is only potentially useful would be completely without merit, and would not support the alleged lack of utility.

In the Final Action the Examiner incorrectly concludes that as any human nucleic acid sequence that contains a naturally occurring polymorphism can be used in forensic analysis, in human paternity determinations or human population migration determinations, such utilities are generic and therefore lack substantial and specific utility. First, Applicants submit that until a specific polymorphic marker is actually described it has very limited utility in forensic analysis. Put another way, simply because there is a possibility, even a significant likelihood, that a particular nucleic acid sequence will contain a polymorphism and thus be useful in forensic analysis, until such a specific polymorphism is actually identified and described, such a likelihood is meaningless. The present case contains identified polymorphisms that occur in the human zinc metaloproteinase ADAMTS15. Should the Examiner be using the information presented for the first time by Applicants in the instant specification as hindsight verification that the presently claimed sequence would be expected to have polymorphic markers. Such a hindsight analysis based on Applicants discovery would not be proper.

Alternatively, any assumption that since any sequence containing a naturally occurring polymorphism can be used such utilities are generic and therefore lack substantial and specific utility may represent a confusion between the requirement for a specific utility, which is the proper standard for utility under 35 U.S.C. § 101, with a requirement for a unique utility. The relevant case law cited by Applicants makes it abundantly clear that the presence of other or even more useful polymorphic markers for forensic analysis does not mean that the present sequences lack a specific utility. As clearly stated by the Federal Circuit in *Carl Zeiss Stiftung v. Renishaw PLC*, 20 USPQ2d 1101 (Fed. Cir. 1991; “*Carl Zeiss*”):

An invention need not be the best or only way to accomplish a certain result, and it need only be useful to some extent and in certain applications: “[T]he fact that an invention has only limited utility and is only operable in certain applications is not grounds for finding a lack of utility.” *Envirotech Corp. v. Al George, Inc.*, 221 USPQ 473, 480 (Fed. Cir. 1984)

Importantly, the holding in the *Carl Zeiss* case is mandatory legal authority that essentially controls the outcome of the present appeal. This case, and particularly the cited quote, directly rebuts any such argument. Furthermore, the requirement for a unique utility is clearly not the standard adopted

by the Patent and Trademark Office. If every invention were required to have a unique utility, the Patent and Trademark Office would no longer be issuing patents on batteries, automobile tires, golf balls, golf clubs, and treatments for a variety of human diseases, such as cancer and bacterial or viral infections, just to name a few particular examples, because examples of each of these have already been described and patented. All batteries have the exact same utility - specifically, to provide power. All automobile tires have the exact same utility - specifically, for use on automobiles. All golf balls and golf clubs have the exact same utility - specifically, use in the game of golf. All cancer treatments have the exact same utility - specifically, to treat cancer. All anti-infectious agents have the exact same broader utility - specifically, to treat infections. However, only the briefest perusal of virtually any issue of the Official Gazette provides numerous examples of patents being granted on each of the above compositions every week. Furthermore, if a composition needed to be unique to be patented, the entire class and subclass system would be an effort in futility, as the class and subclass system serves solely to group such common inventions, which would not be required if each invention needed to have a unique utility. Thus, the present sequence clearly meets the requirements of 35 U.S.C. § 101.

Although the above discussions are believed to be dispositive of the utility issue in this case, Applicants would like to further direct the Examiner's attention to the parts of the specification that describe the use of sequences in a gene chip format to provide a high throughput analysis of the relevant cellular "transcriptome", including assessing temporal and tissue specific gene expression patterns, particularly using a high throughput "chip" format (specification at or about page 6, line 10 through page 8).

Evidence of the "real world" substantial utility of the present invention is further provided by the fact that there is an entire industry established based on the use of gene sequences or fragments thereof in a gene chip format. Perhaps the most notable gene chip company is Affymetrix. However, there are many companies which have, at one time or another, concentrated on the use of gene sequences or fragments, in gene chip and non-gene chip formats, for example: Gene Logic, ABI-Perkin-Elmer, HySeq and Incyte. In addition, one such company, Rosetta Inpharmatics, was viewed to have such "real world" value that it was acquired by large pharmaceutical company, Merck & Co., for substantial sums of money (net equity value of the transaction was \$620 million). The "real world" substantial industrial utility of gene sequences or fragments would, therefore, appear

to be widespread and well established. Clearly, persons of skill in the art, as well as venture capitalists and investors, readily recognize the utility, both scientific and commercial, of genomic data in general, and specifically human genomic data. Billions of dollars have been invested in the human genome project, resulting in useful genomic data (see, *e.g.*, Venter *et al.*, 2001, *Science* 291:1304, presented as **Exhibit 2**). The results have been a stunning success as the utility of human genomic data has been widely recognized as a great gift to humanity (see, *e.g.*, Jasny and Kennedy, 2001, *Science* 291:1153, presented as **Exhibit 3**). Clearly, the usefulness of human genomic data, such as the presently claimed nucleic acid molecules, is substantial and credible (worthy of billions of dollars and the creation of numerous companies focused on such information) and well-established (the utility of human genomic information has been clearly understood for many years). The sequences of the present invention have particularly specific utility in DNA gene chip based analysis as they have been identified to contain several coding region single nucleotide polymorphisms (cSNPs), thus increasing their utility in DNA gene chip based analysis.

DNA chips clearly have utility, as evidenced by hundreds of issued U.S. Patents, as exemplified by U.S. Patent Nos. 5,445,934, 5,556,752, 5,744,305, 5,837,832, 6,156,501 and 6,261,776 (**Exhibits 4-6**; copies of issued U.S. Patents not provided pursuant to current United States Patent and Trademark Office policy). Accordingly, the present sequence has a specific utility in such DNA chip applications. Clearly, compositions that enhance the utility of such DNA chips, like the present sequences, which encode a novel human zinc metaloproteinase, ADAMTS15, have identified polymorphisms and a characterized tissue expression pattern, must have utility. The sequences of the present invention which encode the human zinc metaloproteinase, ADAMTS15, provide specific markers for a human genome (see also the chromosome mapping discussion and evidence presented in Applicants previous Response. Thus, those skilled in the art would instantly recognize that the sequences of the present invention would be an ideal, novel candidate for assessing gene expression using, for example, DNA chips, as the specification details. Accordingly, the present sequence has a specific utility in such DNA chip applications. Clearly, compositions that enhance the utility of such DNA chips, such as the presently claimed nucleotide sequence encoding human zinc metaloproteinase ADAMTS15 must also be useful.

The Examiner is further requested to reconsider that, given the huge expense of the drug discovery process, even negative information obtained using these specific markers of expression

of a human zinc metaloproteinase ADAMTS15 provides very specific markers for the human genome and have great “real world” practical utility. Knowing that a given gene is not expressed in medically relevant tissue provides an informative finding of great value to industry by allowing for the more efficient deployment of expensive drug discovery resources. Such practical considerations are equally applicable to the scientific community in general, in that time and resources are not wasted chasing what are essentially scientific dead-ends (from the perspective of medical relevance). Clearly, compositions that enhance the utility of DNA gene chips, such as the presently claimed sequences encoding human zinc metaloproteinase ADAMTS15, must in themselves be useful. Moreover, the presently described human zinc metaloproteinase ADAMTS15 sequences provide uniquely specific sequence resources for identifying and quantifying full length transcripts that were encoded by the corresponding human genomic locus. Accordingly, there can be no question that the described sequences provide an exquisitely specific utility for analyzing gene expression. Thus, the present claims clearly meet the requirements of 35 U.S.C. § 101.

In addition, among other things the mapping of the relatively few expressed human genes to a particular chromosome has long been a recognized method of identifying a genes associated with particular diseases. Furthermore, the mapping of the human chromosome is a project of such widely recognized importance by those of skill in the art and even lay people, that both the US government and private corporations have dedicated millions of dollars to such a project. One is thus forced to ask, if the mapping of human chromosomes is a throw away utility then why has the US government spent so many taxpayer dollars on this project?

Finally, while the Final Action argues that the present situation is analogous to *Brenner v. Manson*, 148 U.S.P.Q. 689 (1966), clearly it is not. The claimed sequences encode the human zinc metalproteinase, ADAMTS15 which has many specific, substantial, well-known and credible utilities. No hunting license is required to identify the utility of the claimed sequences which encode the human zinc metalproteinase, ADAMTS15, as several of the most recognized utilities are published and are evidenced in the exhibits submitted in this case.

With full recognition of the fact that all patent applications are examined on their own merits and that the prosecution of one patent does not effect the prosecution of another patent, *In re Wertheim*, 541 F.2d 257, 264, 191 USPQ 90, 97 (CCPA 1976), however the issue at hand in one of whether the fact that patents have issued recognizing the utility of a class of molecules does this

confers a statutory precedent of patentability to a broad class of compositions (nucleic acid sequences). Thus, there remains a lingering issue regarding due process and equitable treatment under the law. While Applicants are well aware of the new Utility Guidelines set forth by the USPTO, Applicants respectfully point out that the current rules and regulations regarding the examination of patent applications is and always has been the patent laws as set forth in 35 U.S.C. and the patent rules as set forth in 37 C.F.R., not the Manual of Patent Examination Procedure or particular guidelines for patent examination set forth by the USPTO. Furthermore, it is the job of the judiciary, not the USPTO, to interpret these laws and rules. Applicants are unaware of any significant recent changes in either 35 U.S.C. § 101, or in the interpretation of 35 U.S.C. § 101 by the Supreme Court or the Federal Circuit that is in keeping with the new Utility Guidelines set forth by the USPTO. This is underscored by numerous patents that have been issued over the years that claim nucleic acid fragments that do not comply with the new Utility Guidelines. As examples of such issued U.S. Patents, the Examiner is invited to review U.S. Patent Nos. 5,817,479, 5,654,173, and 5,552,281 (each of which claims short polynucleotides; **Exhibits 7-9**; copies of issued U.S. Patents not provided pursuant to current United States Patent and Trademark Office policy), and recently issued U.S. Patent No. 6,340,583 (which includes no working examples; **Exhibit 10**; copies of issued U.S. Patents not provided pursuant to current United States Patent and Trademark Office policy), none of which contain examples of the “real-world” utilities that the Examiner appears to desire. As issued U.S. Patents are presumed to meet all of the requirements for patentability, including 35 U.S.C. §§ 101 and 112, first paragraph (see Section below), Applicants submit that the present polynucleotides, which encode human zinc metaloproteinase ADAMTS15 an enzyme with well recognized utility, must also meet the requirements of 35 U.S.C. § 101. While Applicants agree that each application is examined on its own merits, Applicants are unaware of any changes to 35 U.S.C. § 101, or in the interpretation of 35 U.S.C. § 101 by the Supreme Court or the Federal Circuit, since the issuance of these patents that render the subject matter claimed in these patents, which is similar to the subject matter in question in the present application, as suddenly non-statutory or failing to meet the requirements of 35 U.S.C. § 101. Thus, holding Applicants invention to a different standard of utility appears inconsistent and inequitable, such a judgement being arbitrary and capricious, a violation of due process and equal protection under the law and cannot be maintained.

In light of the evidence presented herewith and for the many compelling reasons described above, it is clear that the claimed sequences of the present invention encode the human zinc metalloproteinase ADAMTS15 and that the utility of such molecules is specific, substantial, credible and well-established. Therefore, Applicants submit that the rejection of the pending claims under 35 U.S.C. § 101 has been avoided. Applicants, therefore, respectfully request withdrawal of the pending rejection of claims under 35 U.S.C. § 101.

V. Rejection of Claims Under 35 U.S.C. § 112, First Paragraph

The Action also rejects all claims under 35 U.S.C. § 112, first paragraph, since allegedly one skilled in the art would not know how to use the invention, as the invention allegedly is not supported by a specific, substantial, and credible utility or a well-established utility. Applicants respectfully traverse.

Applicants submit that the claimed sequences encoding human zinc metalloproteinase ADAMTS15 have been shown to have “a specific, substantial, and credible utility”, as detailed in the preceding section, the rejection under 35 U.S.C. § 112, first paragraph, has been avoided. Applicants therefore request that the rejection of the pending claims under 35 U.S.C. § 112, first paragraph, be withdrawn.

VI. Rejection of Claims 2 and 3 Under 35 U.S.C. § 112, Second Paragraph

The Action maintains the prior rejection of claims 2 and 3 under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the invention. Claims 2 and 3 stand rejected because the Examiner improperly alleges that the phrase “highly stringent conditions”, which the Examiner has acknowledged is defined in the specification, remains indefinite and that the claim should include exact hybridization conditions in order to be definite. Applicants’ respectfully disagree and are of the opinion that this issue has been previously settled and in light of a recent Board decision in support of this position, Applicants maintain their position that hybridization claims are not required to expressly state conditions in order to be definite. Therefore, Applicants believe that the rejection of Claims 2 and 3 under 35 U.S.C. § 112, second paragraph as being indefinite should be withdrawn.

VII. Rejection of Claim 2 and 3 Under 35 U.S.C. § 112, First Paragraph

The Action next rejects Claim 2 under 35 U.S.C. § 112, first paragraph, as allegedly containing subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. Applicants respectfully traverse.

35 U.S.C. § 112, first paragraph, requires that the specification contain a written description of the invention. The Federal Circuit in *Vas-Cath Inc. v. Mahurkar* (19 USPQ2d 1111 (Fed. Cir. 1991); “*Vas-Cath*”) held that an “applicant must convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of *the invention*.” *Vas-Cath*, at 1117, emphasis in original. However, it is important to note that the above finding uses the terms reasonable clarity to those skilled in the art. Further, the Federal Circuit in *In re Gosteli* (10 USPQ2d 1614 (Fed. Cir. 1989); “*Gosteli*”) held:

Although [the applicant] does not have to describe exactly the subject matter claimed, . . . the description must clearly allow persons of ordinary skill in the art to recognize that [he or she] invented what is claimed.

Gosteli at 1618, emphasis added. Additionally, *Utter v. Hiraga* (6 USPQ2d 1709 (Fed. Cir. 1988); “*Utter*”), held “(a) specification may, within the meaning of 35 U.S.C. § 112 ¶1, contain a written description of a broadly claimed invention without describing all species that claim encompasses” (*Utter*, at 1714). Therefore, all Applicants must do to comply with 35 U.S.C. § 112, first paragraph, is to convey the invention with reasonable clarity to the skilled artisan.

Further, the Federal Circuit has held that an adequate description of a chemical genus “requires a precise definition, such as by structure, formula, chemical name or physical properties” sufficient to distinguish the genus from other materials. *Fiers v. Sugano*, 25 USPQ2d 1601, 1606 (Fed. Cir. 1993; “*Fiers*”). *Fiers* goes on to hold that the “application satisfies the written description requirement since it sets forth the . . . nucleotide sequence” (*Fiers* at 1607). In other words, provision of a structure and formula - the nucleotide sequence - renders the application in compliance with 35 U.S.C. § 112, first paragraph.

More recently, the standard for complying with the written description requirement in claims involving chemical materials has been explicitly set forth by the Federal Circuit:

In claims involving chemical materials, generic formulae usually indicate with specificity what the generic claims encompass. One skilled in the art can distinguish such a formula from others and can identify many of the species that the claims encompass. Accordingly, such a formula is normally an adequate description of the claimed genus. *Univ. of California v. Eli Lilly and Co.*, 43 USPQ2d 1398, 1406 (Fed. Cir. 1997).

Thus, a claim describing a genus of nucleic acids by structure, formula, chemical name or physical properties sufficient to allow one of ordinary skill in the art to distinguish the genus from other materials meets the written description requirement of 35 U.S.C. § 112, first paragraph. As further elaborated by the Federal Circuit in *Univ. of California v. Eli Lilly and Co.*:

In claims to genetic material ... a generic statement such as ‘vertebrate insulin cDNA’ or ‘mammalian insulin cDNA’, without more, is not an adequate written description of the genus because it does not distinguish the claimed genus from others, except by function. It does not specifically define any of the genes that fall within its definition. It does not define any structural features commonly possessed by members of the genus that distinguish them from others. One skilled in the art cannot, as one can do with a fully described genus, visualize or recognize the identity of members of the genus. (Emphasis added)

Thus, as opposed to the situation set forth in *Univ. of California v. Eli Lilly and Co.* and *Fiers*, the nucleic acid sequences of the present invention are not distinguished on the basis of function, or a method of isolation, but in fact are distinguished by structural features - a chemical formula, *i.e.*, the *sequence itself*.

Applicants respectfully submit that the sequence defined in Claim 2 (and thus dependent claim 3) has two limitations, the first being that molecules which encode the amino acid sequence

shown in SEQ ID NO: 4; and the second being hybridization under stringent conditions to the nucleotide sequence of SEQ ID NO: 3 or the complement thereof and covered nucleic acid molecules must meet both conditions, not just one. Applicants submit that the nucleic acid molecules identified by the intersection of both parts of Claim 2, those that encode the amino acid sequence shown in SEQ ID NO: 4; and hybridize under stringent conditions to the nucleotide sequence of SEQ ID NO: 3 or the complement thereof, is a finite and well defined group, which those of skill in the art could easily identify and would know how to make and use. Therefore, Applicants respectfully submit that the rejection of Claims 2 and 3 under 35 U.S.C. § 112, first paragraph, is not now nor was it ever proper. Applicants therefore request withdrawal of this rejection.

VIII. Rejection of Claims 2 and 3 Under 35 U.S.C. § 102(e)

The Final Action improperly maintains the rejection of claims 2 and 3 under 35 U.S.C. § 102(e) as allegedly being potentially anticipated by a PCT Application filed by Yue, *et al* (WO 01/98468). Applicants note that they did not receive the pertinent parts of this application, however Applicants have been able to confirm that said application contains a similar though not identical sequence. Applicants herewith provide as evidence, an amino acid comparison between SEQ ID NO:4 and the amino acid sequence of Yue, *et al* (WO 01/98468) which demonstrates that these amino acid sequences (and the nucleic acid sequences that encode them) are not identical (**Exhibit 11**).

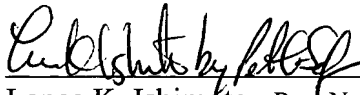
Once again the Examiner has neglected to recognize that Claim 2 and thus the sequence claimed in dependent Claim 3 has two limitations, the first being that molecules which encode the amino acid sequence shown in SEQ ID NO: 4; and the second being hybridization under stringent conditions to the nucleotide sequence of SEQ ID NO: 3 or the complement thereof. Even if, *arguedo*, the disclosed sequences would hybridize to SEQ ID NO: 3, they would not be anticipated to encode the amino acid sequence shown in SEQ ID NO: 4 and would therefore could never anticipate Claims 2 and 3. Therefore, Applicants respectfully request that the rejection Under 35 U.S.C. § 102(e) be withdrawn.

IX. Conclusion

The present document is a full and complete response to the Action. In conclusion, Applicants submit that, in light of the foregoing remarks, the present case is in condition for allowance, and such favorable action is respectfully requested. Should Examiner Nashed have any questions or comments, or believe that certain amendments of the claims might serve to improve their clarity, a telephone call to the undersigned Applicants' representative is earnestly solicited.

Respectfully submitted,

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Date


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